

COMMENTS FROM SCREEN GUIDELINE PEER REVIEW WORKSHOP, YAKIMA, 5/24/00

These notes summarize comments and discussion from a guideline peer review workshop in Yakima on May 24, 2000. There were about 45 participants at the workshop representing federal, state, and local agencies and consultants in resource management, timber, tribes, hydroelectric and irrigation interests.

These comments are a continuation of the fishway comments. Many of the comments and issues apply to both guidelines (technology development, experimental facilities, evaluation and monitoring). If comments were made in reference to the fishway guidelines, they are not necessarily repeated here. Both sets of comments will be considered when editing each of the guidelines.

Guiding Principles

- Criteria are currently based on migratory fish, but should incorporate other considerations (water quality, worst conditions, fish size, etc.) At present approach velocity, perforated plate/ woven mesh size, profile bar, sediment control, porosity are considered.
- A guiding principle includes voluntary passage. There are many examples of non-voluntary guidance in the manual.
 - For example, downwell on bypass is not voluntary and the headgate itself is often an impassable barrier for small fish.
 - If a fish wants to migrate upstream ok, but if a fish cannot migrate back upstream requires a different thought.
 - One consideration could be; does the fish have the capability of migrating back upstream (upstream passage fishway at diversion dam)?
 - Screens might be located in good rearing habitat and therefore endangers fish.
 - some resident fish want to pass but not to the ocean
- Should fish size and water quality be combined? Criteria should be for swim up fish.
- Screen criteria should be relative to size of fish and temperature of water as they change during the season.
- What data definitively shows the relationship between velocity and impingement? Is there data that evaluates exposure time (resident species, swim-up fry), the effects of sweeping velocity as well as by-pass? (Research at Davis mentioned).
- Default conditions are characteristically worst case scenarios.
- Design for severe winter operations. Seasonal issues of ice build-up should be included. Ice relates more to plugging than directly to fish passage.
- Screens should be at head end of canal to minimize the bypass reach.
- Design against screen plugging, and winter operation.

Screen Criteria

- Consider kelts and fallbacks
- Startup/shutdown operating criteria should be provided relative to stranding in canals. Salvage out of canal, how do you dewater?
- Approach velocity
 - Approach velocity is not exceeded anywhere, should we allow some variability?
 - Fabricators of screens have a tolerance spec on the screen opening dimension.
 - The Bureau uses a specification for 10% of the total area on the mesh
 - The approach velocity criteria is for clean screens only
 - How much information do we have that 0.5 fps impinges fish?
 - Was there impingement at White River? At 1.5 to 2 fps there was no impingement to fry. Approach velocity was 0.4 fps.
 - Approach velocity criteria needs to be reconsidered.
 - What is the purpose of the 0.8 criteria, it is never used?

- Bottom line is fish survival. Pick a desired survival % (80-90) and then select screening method independent of approach velocity.
- Sweeping velocity may or may not allow debris to accumulate.
- Porosity should be engineering criteria and should say minimum
 - Impingement is less for less porosity; not clear if there is a threshold.
- Exposure duration
 - Where did 1 min criteria come from? Seems too short.
 - How do you make a decision that a bypass is worse than the exposure time on the face of a screen? Why force a bypass when > 1 min ?
 - There was a lot of discussion about this in the early 80's. Biologists need to tell engineers what the criteria are.
- In California there is a feeling that the criteria is negotiable.
- Burden needs to be on water user.
- There is much greater indirect mortality at water diversions than we first thought. We need to be conservative on the side of the fish because of other stresses.
- Turbulence at screen face
 - Jet of water from underflow gates near screen face can eliminate guidance.
 - On the Cowlitz Project (and elsewhere), turbulence may be good for guiding fish.

Styles of Screens

- Consider low cost screens, infiltration galleries
 - NRCS in Oregon has been using gravel packed around a pipe
 - These designs are not far enough away from the fish, and they can work through the gravel.
- MIS and Eicher screen has been studied for years with a lot of data, why is it still experimental? They have been studied for some time but only a few data points have been gathered.
- Piers in drum screen installations become obstruction to flow. Guidance on appropriate angle should be provided.

Sediment management

Sediment should be a design issue, not a maintenance issue

Bypass

- Most by-pass width criteria have been developed for canals - other conditions such as FMC-type belt screens should be considered.
- What is a reasonable entrance velocity?
- Bypass conduit criteria requires smooth surfaces and joints. What does Asmooth@mean?
- Define when these criteria are appropriate/ inappropriate (i.e. not appropriate for backwater situations)
- No criteria exist for down well. Should there be? At what level of turbulence are fish still in control and/or safe? WDFW has tabulated EDF measurements for screen bypass downwells including facilities that have been evaluated biologically.
- By-pass entrance: direction of flow coming into drum screen needs to be considered, as well as the angle of the drums in the canal.
- In a lake system, should screens be designed without a bypass?
- Direction of bypass alignment should be to minimize hydraulic disturbance.
 - Work has been done with dye tests and approach transitions.
 - Ramped bypasses have dead flow areas.
- Kelts have been observed stuck on bypass weirs.
- USBR sites necked down to 12 to 15 inches. This was a problem for debris removal.

Bypass Conduit

- Need a definition of the materials allowed in bypass conduit.
- Freefall, is this the same in a downwell? Freefall ok as long as it's aerated and enough volume to dissipate without excess turbulence.
- On the USBR sites they don't always get open channel flow.

- WE need to see and check the insides of bypasses to inspect for debris.
 - For pipe inspection, minimum diameter is 30 inches (human entrance).
- Pressurized conduits should be included in the criteria.

Evaluation and Monitoring

- There should be a testing process for each facility. Stocks get put upstream and change the criteria to 0.4 fps.
- See comments from fishway workshop.